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# NEW UTILITY PATENT APPLICATION TRANSMITTAL

(to be used for new applications only)

Attorney Docket Number

1162US

First Named Inventor

Balmas

Total Pages in this Submission

10

JCE41 U.S. PRO  
68/6895  
10/13/00**APPLICATION ELEMENTS**

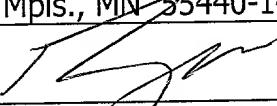
Notice: Checklist items mentioned under Application Elements section construct a new utility patent application. Please refer to MPEP Sections 506, 601, (37 CFR 1.77, 1.53, 35 USC 111, 112, 113) for detailed explanation regarding completeness of an original patent application

1.  Fee Transmittal Form (prescribing filing fee(s))
2.  Specification
  - Title of the Invention
  - Cross References to Related Applications (if applicable)
  - State Regarding Federally-sponsored Research Development (if applicable)
  - Reference to Microfiche Appendix (if applicable)
  - Background of the Invention
  - Brief Summary of the Invention
  - Brief Description of the Drawings (if drawings filed)
  - Detailed Description
  - Claim or Claims
  - Abstract of the Disclosure
3.  Drawing(s) (when necessary as prescribed by 35 USC 113)
4.  Executed Declaration
5. Genetic Sequence Submission (if applicable, all must be included)
  - Paper Copy
  - Computer Readable Copy
  - Statement Verifying Identical Paper and Computer Readable Copy

**ACCOMPANYING APPLICATION PARTS**

6.  Assignment Papers
7.  Certified Copy of Priority Document(s) (if foreign priority is claimed)
8.  Computer Program in Microfiche
9.  English Translation Document (if applicable)
10.  Information Disclosure Statement / PTO-1449
  - Copies of IDS Citations
11.  Petition Checklist and Accompanying Petition
12.  Preliminary Amendment
13.  Proprietary Information
14.  Return Receipt Postcard
15.  Small Entity Statement
16.  Additional Enclosures (please identify below)

**SIGNATURE OF APPLICANT, ATTORNEY OR AGENT (Send correspondence to:)**

Firm or Individual Name	Douglas B. Farrow Graco Minnesota Inc. P. O. Box 1441 Mpls., MN 55440-1441
Signature	
Date	October 13, 2000

**FOR OFFICIAL USE ONLY**

Application Number		Class		Independent Claims	
Date of Receipt	Application Type	GAU		Total Claims	
	Filing Date	Foreign Filing License?		Drawings Sheets	
	Small Entity	Foreign Address?		Special Handling?	

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# FEE TRANSMITTAL

## for FY 2000

Patent fees are subject to annual revision.

Small Entity payments must be supported by a small entity statement, otherwise large entity fees must be paid. See Forms PTO/SB/09-12  
See 37 C.F.R. §§ 1.27 and 1.28**TOTAL AMOUNT OF PAYMENT** **\$ 710.00***Complete if Known*

Application Number

Filing Date

First Named Inventor

Group Art Unit

Examiner Name

Attorney Docket Number

1162US

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<b>METHOD OF PAYMENT (check one)</b>				<b>FEE CALCULATION (continued)</b>			
1. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge indicated fees and credit any over payments to				<b>3. ADDITIONAL FEES</b> Large Entity Small Entity Code (\$) Code (\$) Fee Description Fee Paid			
Deposit Account Number <b>07-1775</b>				105	130	205	65
				127	50	227	25
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				115	110	215	55
				116	390	216	195
				117	890	217	445
				118	1390	218	695
				119	310	219	155
				120	310	220	155
				121	270	221	135
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				141	1240	241	620
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				143	440	243	220
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				123	50	123	50
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				581	40	581	40
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				149	710	249	355
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				SUBTOTAL (3) \$ 0.00			
<b>FEE CALCULATION (fees effective 10/01/97)</b>							
<b>1. BASIC FILING FEE</b> Large Entity Small Entity Fee Fee Fee Fee Code (\$) Code (\$) Fee Description Fee Paid							
101 710 201 355 Utility filing fee 710.00 106 320 206 160 Design filing fee 107 490 207 245 Plant filing fee 108 740 208 355 Reissue filing fee 114 150 214 75 Provisional filing fee SUBTOTAL (1) \$ 710.00							
<b>2. EXTRA CLAIM FEES</b> Total Claims -20** = X = Independent Claims - 3** = X = Multiple Dependent Claims X = **or number previously paid, if greater; For Reissues, see below							
<b>Large Entity Small Entity</b> Fee Fee Fee Fee Code (\$) Code (\$) Fee Description							
103 18 203 09 Claims in excess of 20 102 80 202 40 Independent claims in excess of 3 104 270 204 135 Multiple dependent claims, if not paid 109 80 209 40 **Reissue independent claims over original patent 110 18 210 09 **Reissue claims in excess of 20 and over original patent SUBTOTAL (2) \$ 0.00							

Complete (if applicable)

Name	Douglas B. Farrow	Registration No.	28582	Telephone:	612-623-6769
Signature					Date

October 13, 2000

Burden Hour Statement This form is estimated to take 0.2 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for ~~Patents~~ Washington, D.C. 20231.

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Attorney Docket Number: 1162US

Inventor's Names and Addresses:

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Citizenship:

United States

Title of Invention:

Sealant Dispensing Correction Method

Send Correspondence To:

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Corporate Intellectual Property Counsel  
Graco Minnesota Inc.  
P.O. Box 1441  
Minneapolis, MN 55440-1441

## **SEALANT DISPENSING CORRECTION METHOD**

### **RELATED APPLICATIONS**

This application is a continuation-in-part of US Application serial number  
5 60/159,141, filed October 13, 1999.

### **BACKGROUND OF THE INVENTION**

Apparatus for dispensing sealants and adhesives and similar materials robotically are well known and typified by U.S. Patent No. 5,847,285 (the contents of which are  
10 incorporated by reference) and the patents referenced and cited therein.

### **SUMMARY OF THE INVENTION**

In summary, the method of the instant invention forms a calibrated relationship  
between pressure and flow rate. The invention as described herein can be utilized in  
15 products such as Graco's PrecisionFlo™ dispenser as a software modification. Pressure is  
measured with a transducer device which provides a 1 to 5 volt output which corresponds  
to 0 to 3500 PSI. The voltage is converted to a pulse width using an external analog to  
digital device. Flow rate is measured with a helical type flow meter which provides a  
pulse corresponding to a calibrated volume passing through it.

The relationship is discovered by dispensing an amount of material and measuring the pressure and flow rate, adjusting the pressure until a user specified flow rate (typically the max flow rate) is achieved within a tolerance. This process is then repeated eight (8) times and a mean pressure to flow rate relationship is established and recorded. The set 5 point for the device is then assumed to be a linear function with the calibrated point as the maximum value and 0,0 is the minimum value.

As the command signal to the unit is modified (for dispensing sealant at a percentage of maximum, e.g. if calibrated at 500 cc/min., a half range signal would represent a 250 cc/min. command) the pressure range for the calibrated point is either 10 extrapolated or interpolated as necessary in order to achieve the correct flow rate. As a result, each time the unit dispenses, it is also recalibrated. This method provides immediate correction for changes in system fluid dynamics thus allowing for a more consistent and predictable dispense profile.

In the preferred embodiment of the instant invention, where the example 15 aforementioned has the max flow rate of 500 cc/min., a half scale level of 250 cc/min. is utilized. The response curve is divided into two segments above and below the median speed dip (half flow rate point) and the slope of the straight line is adjusted accordingly.

These and other objects and advantages of the invention will appear more fully 20 from the following description made in conjunction with the accompanying drawings wherein like reference characters refer to the same or similar parts throughout the several views.

## A BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows the pressure/flow table as initially established and after adjustment.

5

## DESCRIPTION OF THE PREFERRED EMBODIMENT

In summary, the method of the instant invention forms a calibrated relationship between pressure and flow rate. The invention as described herein can be utilized in products such as Graco's PrecisionFlo™ dispenser as a software modification. Pressure is measured with a transducer device which provides a 1 to 5 volt output which corresponds to 0 to 3500 PSI. The voltage is converted to a pulse width using an external analog to digital device. Flow rate is measured with a helical type flow meter which provides a pulse corresponding to a calibrated volume passing through it.

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10 For example, in Figure 1, slope B represents the initial calibration while slopes A and C represent corrected linear relationships.

It is contemplated that various changes and modifications may be made to the dispensing correction method without departing from the spirit and scope of the invention as defined by the following claims.

WHAT IS CLAIMED IS:

1. A method for flow correction of the calibrated relationship between pressure and flow rate comprising the steps of:

initially measuring the flow of a fluid through a dispensing device and forming a

5 linear relationship between pressure and flow, said linear relationship  
having a maximum flow point and a slope;

providing a desired flow rate;

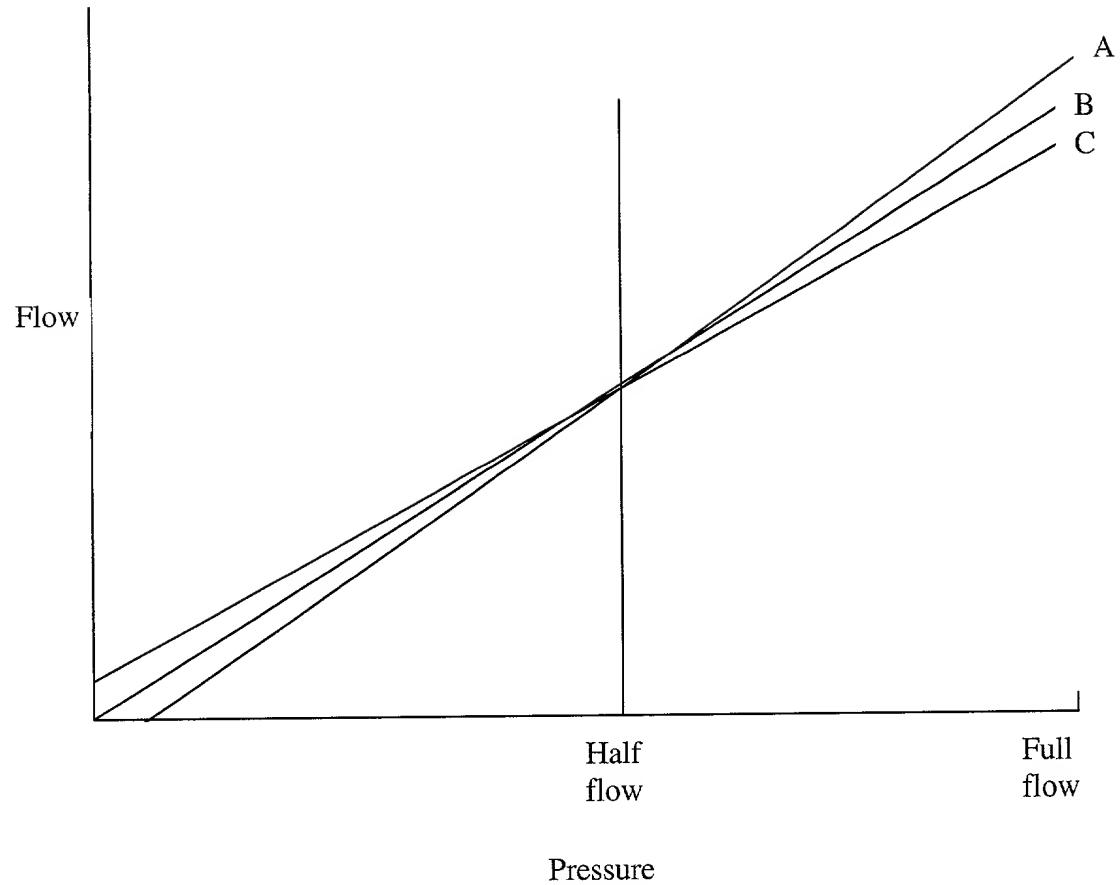
interpolating the desired pressure for said desired flow rate from said linear  
relationship;

10 dispensing through said dispensing device according to said desired pressure; and  
measuring the flow through said dispensing device during subsequent dispense  
cycles and adjusting said slope to yield the desired dispense volume.

2. A method of flow correction of claim 1 wherein said linear relationship is divided  
into at least two segments, the slope of each of said segments being adjusted individually.

## **ABSTRACT**

As the command signal to a unit for dispensing sealant is modified, the pressure range for the calibrated point is either extrapolated or interpolated as necessary in order to achieve the correct flow rate. As a result, each time the unit dispenses, it is also recalibrated. This method provides immediate correction for changes in system fluid dynamics thus allowing for a more consistent and predictable dispense profile.



**Figure 1**